



## SEQUENCE LISTING

<110> Larenas, Edmund A.  
Goedegebuur, Frits  
Gualfetti, Peter  
Mitchinson, Colin

<120> Variant Humicola grisea CBH1.1

<130> GC794-2

<140> US 10/810,277  
<141> 2004-03-26

<150> US 60/459,734  
<151> 2003-04-01

<160> 15

<170> FastSEQ for Windows Version 4.0

<210> 1  
<211> 1638  
<212> DNA  
<213> Humicola grisea

<400> 1  
atgcgttaccg ccaagttcgc caccctcgcc gcccttgtgg cctcgccgc cgcccagcag 60  
gcgtgcagtc tcaccaccga gaggcaccct tccctctctt ggaagaagtg caccgcccgc 120  
ggccagtgcc agaccgtcca ggcttccatc actctcgact ccaactggcg ctggactcac 180  
caggtgtctg gctccaccaa ctgctacacg ggcaacaagt gggatactag catctgcact 240  
gatgccaagt cgtgcgctca gaactgctgc gtcgatggtg ccgactacac cagcacctat 300  
ggcatcacca ccaacggta ttccctgagc ctcaagttcg tcaccaaggg ccagcactcg 360  
accaacgtcg gtcgcgtac ctacctgatg gacggcgagg acaagtatca gagtacgttc 420  
tatcttcagc cttctcgccgc cttgaatcct ggctaacgtt tacacttcac agccttcgag 480  
ctcctcgca acgagttcac cttcgatgtc gatgtctcca acatcggtcg cggtctcaac 540  
ggcgccctgt acttcgtctc catggacgcc gatgggtgtc tcagccgcta tcctggcaac 600  
aaggctggtg ccaagtacgg taccggctac tgcgatgctc agtcccccg tgacatcaag 660  
ttcatcaacg gcgaggccaa cattgagggc tggaccggct ccaccaacga ccccaacgcc 720  
ggcgccggcc gctatggta ctgctgctc gagatggata tctgggaagc caacaacatg 780  
gctactgcct tcactcctca cccttgcacc atcattggcc agagccgctg cgagggcgac 840  
tcgtgcggtg gcacctacag caacgagcgc tacggccggcg tctgcgaccc cgatggctgc 900  
gacttcaact cgtaccgcca gggcaacaag accttctacg gcaagggcat gaccgtcgac 960  
accaccaaga agatcactgt cgtaacccag ttcctcaagg atgccaacgg cgatctcgcc 1020  
gagatcaagc gcttctacgt ccaggatggc aagatcatcc ccaactccga gtccaccatc 1080  
cccgccgtcg agggcaattc catcacccag gactgggtcg accgcccaga gggtgcctt 1140  
ggcgacattg acgacttcaa ccgcaaggcc ggcataagc agatgggcaa ggccctcgcc 1200  
ggccccatgg tcctggtcat gtccatctgg gatgaccacg cctccaacat gctctggctc 1260  
gactcgacct tccctgtcga tgccgctggc aagccccggc ccgagcgcgg tgccctgccc 1320  
accacctcggtgtccctgc tgaggttgag gccgaggccc ccaacagcaa cgtcgcttc 1380  
tccaacatcc gcttcggccc catcggtcg accgttgcgt gtcctcccg cgccggcaac 1440  
ggcgccacaac acggcgccaa ccccccggcc cccaccacca ccacctcctc ggctccggcc 1500  
accaccacca ccccgccagcgc tggccccaag gctggccgct ggcagcagtg cggcggcatc 1560  
ggcttcactg gcccggccaa gtgcgaggag ccctacactt gcaccaagct caacgactgg 1620  
tactctcagt gcctgtaa 1638

<210> 2  
<211> 1323  
<212> DNA  
<213> Humicola grisea

<400> 2

gctcagaact	gctgcgtcga	tgggccgac	tacaccagca	cctatggcat	caccaccaac	60
ggtgattccc	tgagcctcaa	gttcgtcacc	aaggccagc	actcgaccaa	cgtcggtcg	120
cgtacctacc	tgatggacgg	cgaggacaag	tatcagacct	tcgagctcct	cgccaacgag	180
ttcaccttcg	atgtcgatgt	ctccaacatc	ggctcggtc	tcaacggcgc	cctgtacttc	240
gtctccatgg	acgcccgtgg	tggtctcagc	cgctatcctg	gcaacaaggc	tggtgccaaag	300
tacggtaccg	gctactgcga	tgctcagtgc	ccccgtgaca	tcaagttcat	caacggcgcag	360
gccaacattg	agggctggac	cggctccacc	aacgacccca	acgcccggcgc	ggccgcstat	420
ggtacctgct	gctctgagat	ggatatctgg	gaagccaaaca	acatggctac	tgccttact	480
cctcaccctt	gcaccatcat	tggccagagc	cgctcgagg	gcaactcgtg	cggtggcacc	540
tacagcaacg	agcgctacgc	cggcgctcgc	gaccccgatg	gctgcgactt	caactcgtac	600
cggcagggca	acaagacctt	ctacggcaag	ggcatgaccg	tcgacaccac	caagaagatc	660
actgtcgta	cccagttcct	caaggatgcc	aacggcgatc	tcggcgagat	caagcgcttc	720
tacgtccagg	atggcaagat	catccccaaac	tccgagtcca	ccatccccgg	cgtcgaggc	780
aattccatca	cccaggactg	gtgcgaccgc	cagaagggtt	ccttggcga	cattgacgac	840
ttcaaccgca	agggcgcat	gaagcagatg	ggcaaggccc	tcgcccggccc	catggtcctg	900
gtcatgtcca	tctggatga	ccacgcctcc	aacatgctct	ggctcgactc	gacccctccct	960
gtcgatgccg	ctggcaagcc	cggcgccgag	cgcgggtgcct	gcccgaccac	ctcgggtgtc	1020
cctgctgagg	ttgaggccga	ggcccccaac	agcaacgtcg	tcttctccaa	catccgcttc	1080
ggccccatcg	gctcgaccgt	tgctggtctc	cccggcgccg	gcaacggcgg	caacaacggc	1140
ggcaacccccc	cgccccccac	caccaccacc	tcctcggctc	cggccaccac	caccaccgcc	1200
agcgctggcc	ccaaggctgg	ccgctggcag	cagtgcggcg	gcatcggctt	cactggcccg	1260
acccagtgcg	aggagcccta	cacttgcacc	aagctcaacg	actggtaactc	tcagtgcctg	1320
taa						1323

<210> 3

<211> 525

<212> PRT

<213> Humicola grisea

<400> 3

Met	Arg	Thr	Ala	Lys	Phe	Ala	Thr	Leu	Ala	Ala	Leu	Val	Ala	Ser	Ala
1				5				10				15			
Ala	Ala	Gln	Gln	Ala	Cys	Ser	Leu	Thr	Thr	Glu	Arg	His	Pro	Ser	Leu
							20			25			30		
Ser	Trp	Lys	Lys	Cys	Thr	Ala	Gly	Gly	Gln	Cys	Gln	Thr	Val	Gln	Ala
						35		40			45				
Ser	Ile	Thr	Leu	Asp	Ser	Asn	Trp	Arg	Trp	Thr	His	Gln	Val	Ser	Gly
						50		55			60				
Ser	Thr	Asn	Cys	Tyr	Thr	Gly	Asn	Lys	Trp	Asp	Thr	Ser	Ile	Cys	Thr
						65		70			75			80	
Asp	Ala	Lys	Ser	Cys	Ala	Gln	Asn	Cys	Cys	Val	Asp	Gly	Ala	Asp	Tyr
						85			90			95			
Thr	Ser	Thr	Tyr	Gly	Ile	Thr	Thr	Asn	Gly	Asp	Ser	Leu	Ser	Leu	Lys
					100			105			110				
Phe	Val	Thr	Lys	Gly	Gln	His	Ser	Thr	Asn	Val	Gly	Ser	Arg	Thr	Tyr
					115			120			125				
Leu	Met	Asp	Gly	Glu	Asp	Lys	Tyr	Gln	Thr	Phe	Glu	Leu	Leu	Gly	Asn
						130		135			140				
Glu	Phe	Thr	Phe	Asp	Val	Asp	Val	Ser	Asn	Ile	Gly	Cys	Gly	Leu	Asn
						145		150			155			160	
Gly	Ala	Leu	Tyr	Phe	Val	Ser	Met	Asp	Ala	Asp	Gly	Gly	Leu	Ser	Arg
						165			170			175			
Tyr	Pro	Gly	Asn	Lys	Ala	Gly	Ala	Lys	Tyr	Gly	Thr	Gly	Tyr	Cys	Asp
						180			185			190			
Ala	Gln	Cys	Pro	Arg	Asp	Ile	Lys	Phe	Ile	Asn	Gly	Glu	Ala	Asn	Ile
						195		200			205				
Glu	Gly	Trp	Thr	Gly	Ser	Thr	Asn	Asp	Pro	Asn	Ala	Gly	Ala	Gly	Arg
						210		215			220				
Tyr	Gly	Thr	Cys	Cys	Ser	Glu	Met	Asp	Ile	Trp	Glu	Ala	Asn	Asn	Met
						225		230			235			240	

Ala Thr Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg  
 245 250 255  
 Cys Glu Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Glu Arg Tyr Ala  
 260 265 270  
 Gly Val Cys Asp Pro Asp Gly Cys Asp Phe Asn Ser Tyr Arg Gln Gly  
 275 280 285  
 Asn Lys Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys  
 290 295 300  
 Ile Thr Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly  
 305 310 315 320  
 Glu Ile Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser  
 325 330 335  
 Glu Ser Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp  
 340 345 350  
 Cys Asp Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg  
 355 360 365  
 Lys Gly Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val  
 370 375 380  
 Leu Val Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu  
 385 390 395 400  
 Asp Ser Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg  
 405 410 415  
 Gly Ala Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu  
 420 425 430  
 Ala Pro Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile  
 435 440 445  
 Gly Ser Thr Val Ala Gly Leu Pro Gly Ala Gly Asn Gly Gly Asn Asn  
 450 455 460  
 Gly Gly Asn Pro Pro Pro Pro Thr Thr Thr Ser Ser Ala Pro Ala  
 465 470 475 480  
 Thr Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly Arg Trp Gln Gln  
 485 490 495  
 Cys Gly Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys Glu Glu Pro Tyr  
 500 505 510  
 Thr Cys Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys Leu  
 515 520 525

<210> 4  
 <211> 507  
 <212> PRT  
 <213> Humicola grisea

<400> 4  
 Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp  
 1 5 10 15  
 Lys Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala Ser Ile  
 20 25 30  
 Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr  
 35 40 45  
 Asn Cys Tyr Thr Gly Asn Lys Trp Asp Thr Ser Ile Cys Thr Asp Ala  
 50 55 60  
 Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser  
 65 70 75 80  
 Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys Phe Val  
 85 90 95  
 Thr Lys Gly Gln His Ser Thr Asn Val Gly Ser Arg Thr Tyr Leu Met  
 100 105 110  
 Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn Glu Phe  
 115 120 125  
 Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn Gly Ala  
 130 135 140  
 Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg Tyr Pro

145	150	155	160
Gly Asn Lys Ala	Gly Ala Lys Tyr Gly	Thr Gly Tyr Cys Asp Ala	Gln
165	170	175	
Cys Pro Arg Asp Ile Lys Phe Ile Asn	Gly Glu Ala Asn Ile	Glu Gly	
180	185	190	
Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala	Gly Ala Gly Arg Tyr Gly		
195	200	205	
Thr Cys Cys Ser Glu Met Asp Ile Trp	Glu Ala Asn Asn Met Ala	Thr	
210	215	220	
Ala Phe Thr Pro His Pro Cys Thr Ile Ile	Gly Gln Ser Arg Cys Glu		
225	230	235	240
Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn	Glu Arg Tyr Ala Gly Val		
245	250	255	
Cys Asp Pro Asp Gly Cys Asp Phe Asn	Ser Tyr Arg Gln Gly Asn Lys		
260	265	270	
Thr Phe Tyr Gly Lys Gly Met Thr Val Asp	Thr Thr Lys Lys Ile Thr		
275	280	285	
Val Val Thr Gln Phe Leu Lys Asp Ala Asn	Gly Asp Leu Gly Glu Ile		
290	295	300	
Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile	Ile Pro Asn Ser Glu Ser		
305	310	315	320
Thr Ile Pro Gly Val Glu Gly Asn Ser	Ile Thr Gln Asp Trp Cys Asp		
325	330	335	
Arg Gln Lys Val Ala Phe Gly Asp Ile Asp	Asp Phe Asn Arg Lys Gly		
340	345	350	
Gly Met Lys Gln Met Gly Lys Ala Leu Ala	Gly Pro Met Val Leu Val		
355	360	365	
Met Ser Ile Trp Asp Asp His Ala Ser Asn	Met Leu Trp Leu Asp Ser		
370	375	380	
Thr Phe Pro Val Asp Ala Ala Gly Lys Pro	Gly Ala Glu Arg Gly Ala		
385	390	395	400
Cys Pro Thr Thr Ser Gly Val Pro Ala Glu	Val Glu Ala Glu Ala Pro		
405	410	415	
Asn Ser Asn Val Val Phe Ser Asn Ile Arg	Phe Gly Pro Ile Gly Ser		
420	425	430	
Thr Val Ala Gly Leu Pro Gly Ala Gly Asn	Gly Gly Asn Asn Gly Gly		
435	440	445	
Asn Pro Pro Pro Thr Thr Thr Ser Ser Ala	Pro Ala Thr Thr		
450	455	460	
Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly	Arg Trp Gln Gln Cys Gly		
465	470	475	480
Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys	Glu Glu Pro Tyr Thr Cys		
485	490	495	
Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys	Leu		
500	505		

<210> 5  
 <211> 507  
 <212> PRT  
 <213> Humicola grisea

<400> 5  
 Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp  
 1 5 10 15  
 Asn Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala Ser Ile  
 20 25 30  
 Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr  
 35 40 45  
 Asn Cys Tyr Thr Gly Asn Lys Trp Asp Thr Ser Ile Cys Thr Asp Ala  
 50 55 60  
 Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser  
 65 70 75 80

Thr	Tyr	Gly	Ile	Thr	Thr	Asn	Gly	Asp	Ser	Leu	Ser	Leu	Lys	Phe	Val
				85					90				95		
Thr	Lys	Gly	Gln	His	Ser	Thr	Asn	Val	Gly	Ser	Arg	Thr	Tyr	Leu	Met
				100				105				110			
Asp	Gly	Glu	Asp	Lys	Tyr	Gln	Thr	Phe	Glu	Leu	Leu	Gly	Asn	Glu	Phe
				115				120				125			
Thr	Phe	Asp	Val	Asp	Val	Ser	Asn	Ile	Gly	Cys	Gly	Leu	Asn	Gly	Ala
				130		135				140					
Leu	Tyr	Phe	Val	Ser	Met	Asp	Ala	Asp	Gly	Gly	Leu	Ser	Arg	Tyr	Pro
				145		150			155				160		
Gly	Asn	Lys	Ala	Gly	Ala	Lys	Tyr	Gly	Thr	Gly	Tyr	Cys	Asp	Ala	Gln
				165				170				175			
Cys	Pro	Arg	Asp	Ile	Lys	Phe	Ile	Asn	Gly	Glu	Ala	Asn	Ile	Glu	Gly
				180				185				190			
Trp	Thr	Gly	Ser	Thr	Asn	Asp	Pro	Asn	Ala	Gly	Ala	Gly	Arg	Tyr	Gly
				195			200				205				
Thr	Cys	Cys	Ser	Glu	Met	Asp	Ile	Trp	Glu	Ala	Asn	Asn	Met	Ala	Thr
				210		215				220					
Ala	Phe	Thr	Pro	His	Pro	Cys	Thr	Ile	Ile	Gly	Gln	Ser	Arg	Cys	Glu
				225		230			235				240		
Gly	Asp	Ser	Cys	Gly	Gly	Thr	Tyr	Ser	Asn	Glu	Arg	Tyr	Ala	Gly	Val
				245				250				255			
Cys	Asp	Pro	Asp	Gly	Cys	Asp	Phe	Asn	Ser	Tyr	Arg	Gln	Gly	Asn	Lys
				260				265				270			
Thr	Phe	Tyr	Gly	Lys	Gly	Met	Thr	Val	Asp	Thr	Thr	Lys	Lys	Ile	Thr
				275			280				285				
Val	Val	Thr	Gln	Phe	Leu	Lys	Asp	Ala	Asn	Gly	Asp	Leu	Gly	Glu	Ile
				290		295				300					
Lys	Arg	Phe	Tyr	Val	Gln	Asp	Gly	Lys	Ile	Ile	Pro	Asn	Ser	Glu	Ser
				305		310				315				320	
Thr	Ile	Pro	Gly	Val	Glu	Gly	Asn	Ser	Ile	Thr	Gln	Asp	Trp	Cys	Asp
				325					330				335		
Arg	Gln	Lys	Val	Ala	Phe	Gly	Asp	Ile	Asp	Asp	Phe	Asn	Arg	Lys	Gly
				340				345				350			
Gly	Met	Lys	Gln	Met	Gly	Lys	Ala	Leu	Ala	Gly	Pro	Met	Val	Leu	Val
				355			360				365				
Met	Ser	Ile	Trp	Asp	Asp	His	Ala	Ser	Asn	Met	Leu	Trp	Leu	Asp	Ser
				370		375				380					
Thr	Phe	Pro	Val	Asp	Ala	Ala	Gly	Lys	Pro	Gly	Ala	Glu	Arg	Gly	Ala
				385		390				395				400	
Cys	Pro	Thr	Thr	Ser	Gly	Val	Pro	Ala	Glu	Val	Glu	Ala	Glu	Ala	Pro
				405				410				415			
Asn	Ser	Asn	Val	Val	Phe	Ser	Asn	Ile	Arg	Phe	Gly	Pro	Ile	Gly	Ser
				420				425				430			
Thr	Val	Ala	Gly	Leu	Pro	Gly	Ala	Gly	Asn	Gly	Gly	Asn	Asn	Gly	Gly
				435			440				445				
Asn	Pro	Pro	Pro	Thr	Thr	Thr	Thr	Ser	Ser	Ala	Pro	Ala	Thr	Thr	
				450		455				460					
Thr	Thr	Ala	Ser	Ala	Gly	Pro	Lys	Ala	Gly	Arg	Trp	Gln	Gln	Cys	Gly
				465		470				475				480	
Gly	Ile	Gly	Phe	Thr	Gly	Pro	Thr	Gln	Cys	Glu	Glu	Pro	Tyr	Ile	Cys
				485				490				495			
Thr	Lys	Leu	Asn	Asp	Trp	Tyr	Ser	Gln	Cys	Leu					
				500				505							

<210> 6

<211> 507

<212> PRT

<213> *Humicola grisea*

<400> 6

Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp

1	5	10	15												
Lys	Lys	Cys	Thr	Ala	Gly	Gly	Gln	Cys	Gln	Thr	Val	Gln	Ala	Ser	Ile
			20					25				30			
Thr	Leu	Asp	Ser	Asn	Trp	Arg	Trp	Thr	His	Gln	Val	Ser	Gly	Ser	Thr
			35					40				45			
Asn	Cys	Tyr	Thr	Gly	Asn	Lys	Trp	Asp	Thr	Ser	Ile	Cys	Thr	Asp	Ala
			50				55				60				
Lys	Ser	Cys	Ala	Gln	Asn	Cys	Cys	Val	Asp	Gly	Ala	Asp	Tyr	Thr	Ser
			65				70			75			80		
Thr	Tyr	Gly	Ile	Thr	Thr	Asn	Gly	Asp	Ser	Leu	Ser	Leu	Lys	Phe	Val
			85					90					95		
Thr	Lys	Gly	Gln	Tyr	Ser	Thr	Asn	Val	Gly	Ser	Arg	Thr	Tyr	Leu	Met
			100					105				110			
Asp	Gly	Glu	Asp	Lys	Tyr	Gln	Thr	Phe	Glu	Leu	Leu	Gly	Asn	Glu	Phe
			115					120				125			
Thr	Phe	Asp	Val	Asp	Val	Ser	Asn	Ile	Gly	Cys	Gly	Leu	Asn	Gly	Ala
			130				135				140				
Leu	Tyr	Phe	Val	Ser	Met	Asp	Ala	Asp	Gly	Gly	Leu	Ser	Arg	Tyr	Pro
			145				150			155			160		
Gly	Asn	Lys	Ala	Gly	Ala	Lys	Tyr	Gly	Thr	Gly	Tyr	Cys	Asp	Ala	Gln
			165					170				175			
Cys	Pro	Arg	Asp	Ile	Lys	Phe	Ile	Asn	Gly	Glu	Ala	Asn	Ile	Glu	Gly
			180					185				190			
Trp	Thr	Gly	Ser	Thr	Asn	Asp	Pro	Asn	Ala	Gly	Ala	Gly	Arg	Tyr	Gly
			195					200				205			
Thr	Cys	Cys	Ser	Glu	Met	Asp	Ile	Trp	Glu	Ala	Asn	Asn	Met	Ala	Thr
			210				215				220				
Ala	Phe	Thr	Pro	His	Pro	Cys	Thr	Ile	Ile	Gly	Gln	Ser	Arg	Cys	Glu
			225				230			235			240		
Gly	Asp	Ser	Cys	Gly	Gly	Thr	Tyr	Ser	Asn	Glu	Arg	Tyr	Ala	Gly	Val
			245					250				255			
Cys	Asp	Pro	Asp	Gly	Cys	Asp	Phe	Asn	Ser	Tyr	Arg	Gln	Gly	Asn	Lys
			260					265				270			
Thr	Phe	Tyr	Gly	Lys	Gly	Met	Thr	Val	Asp	Thr	Thr	Lys	Lys	Ile	Thr
			275					280				285			
Val	Val	Thr	Gln	Phe	Leu	Lys	Asp	Ala	Asn	Gly	Asp	Leu	Gly	Glu	Ile
			290				295				300				
Lys	Arg	Phe	Tyr	Val	Gln	Asp	Gly	Lys	Ile	Ile	Pro	Asn	Ser	Glu	Ser
			305				310			315			320		
Thr	Ile	Pro	Gly	Val	Glu	Gly	Asn	Ser	Ile	Thr	Gln	Asp	Trp	Cys	Asp
			325					330				335			
Arg	Gln	Lys	Val	Ala	Phe	Gly	Asp	Ile	Asp	Asp	Phe	Asn	Arg	Lys	Gly
			340					345				350			
Gly	Met	Lys	Gln	Met	Gly	Lys	Ala	Leu	Ala	Gly	Pro	Met	Val	Leu	Val
			355					360				365			
Met	Ser	Ile	Trp	Asp	Asp	His	Ala	Ser	Asn	Met	Leu	Trp	Leu	Asp	Ser
			370				375				380				
Thr	Phe	Pro	Val	Asp	Ala	Ala	Gly	Lys	Pro	Gly	Ala	Glu	Arg	Gly	Ala
			385				390			395			400		
Cys	Pro	Thr	Thr	Ser	Gly	Val	Pro	Ala	Glu	Val	Glu	Ala	Glu	Ala	Pro
			405					410				415			
Asn	Ser	Asn	Val	Val	Phe	Ser	Asn	Ile	Arg	Phe	Gly	Pro	Ile	Gly	Ser
			420					425				430			
Thr	Val	Ala	Gly	Leu	Pro	Gly	Ala	Gly	Asn	Gly	Gly	Asn	Asn	Gly	Gly
			435					440				445			
Asn	Pro	Pro	Pro	Thr	Thr	Thr	Thr	Ser	Ser	Ala	Pro	Ala	Thr	Thr	
			450					455				460			
Thr	Thr	Ala	Ser	Ala	Gly	Pro	Lys	Ala	Gly	Arg	Trp	Gln	Gln	Cys	Gly
			465				470			475			480		
Gly	Ile	Gly	Phe	Thr	Gly	Pro	Thr	Gln	Cys	Glu	Glu	Pro	Tyr	Thr	Cys
			485					490				495			
Thr	Lys	Leu	Asn	Asp	Trp	Tyr	Ser	Gln	Cys	Leu					

<210> 7  
 <211> 1662  
 <212> DNA  
 <213> *Scy whole*

<400> 7

atgcgttaccg	ccaagttcgcc	caccctcgcc	gcccttgtgg	cctcggccgc	cgcccagcag	60
gcgtgcagcc	tcaccaccga	gaggcaccct	tccctctcct	ggaagaagtgc	caccgcccggc	120
ggccagtgcc	agaccgtcca	ggcttccatc	actctcgact	ccaactggcg	ctggactcac	180
caggtgtctg	gctccaccaa	ctgctacacg	ggcaacgagt	gggattctag	catctgcact	240
gatgccaagt	cgtgcgtca	gaactgctgc	gtcgatggtg	ctgactacac	cagcacctat	300
ggcatcacca	ccaacggtga	ttccctgagc	ctcaagttcg	tcaccaaggg	ccagtagtgc	360
accaacgtcg	gctcggtac	ctacctgatg	gacggcgagg	acaagtatca	gagtaggttc	420
tatcttcagc	cttctcgcc	cttgaatcct	ggctaacttt	tacacttcac	agccttcgag	480
ctcctcggtca	acgagttcac	cttcgatgtc	gatgtctcca	acatcggtcg	cggctcaac	540
ggcgccctgt	acttcgttcc	catggacgccc	gatgggtggc	tcagccgcta	tcctggcaac	600
aaggctggtg	ccaagttacgg	taccggctac	tgcgtatgtc	agtgcggcc	tgacatcaag	660
ttcatcaacg	gcgaggccaa	cattgagggc	tggaccggct	ccaccaacga	ccccaaacgccc	720
ggcgccggcc	gctatggta	ctgctgtct	gagatggata	tctgggaggc	caacaacatg	780
gctactgcct	tcactcctca	cccttgcact	atcattggcc	agagccgctg	cgagggcgac	840
tcgtgcgttg	gcacctacag	caacgaccgc	tacggccggcg	tctgcgaccc	cgatggctgc	900
gacttcaacg	cgtatcgcca	gggcaacaag	accttctacg	gcaagggcat	gaccgtcgac	960
accaccaaga	agtcaccgt	cgtcaccctac	ttcctcaagg	acgccaacgg	cgatctcgcc	1020
gagatcaacg	gcttctacgt	ccaggatggg	aagatcatcc	ccaactccga	gtccaccatc	1080
cccgccgtcg	agggaactc	catcaccctac	gattgggtcg	accggccagaa	ggttgcctt	1140
ggcgacattg	acgacttcaa	ccgcaagggc	ggcatgaagc	agatgggcaa	ggccctcgcc	1200
ggcccccattgg	tcctggtcat	gtccatctgg	gatgaccacg	cctccaaat	gctctggctc	1260
gactcgaccc	tccctgtcga	tgccgtggc	aagccggcg	ccgagcgccg	tgcctgccc	1320
accacctcg	gtgtccctgc	tgagggttag	gccgaggccc	ccaaacagcaa	cgtcgcttcc	1380
tccaaacatcc	gcttcggccc	catcggtcg	accgttgcgg	gccttccag	cgatggccggc	1440
aacaacggcg	gcaacaccac	cgtccagccc	ccgcccagca	ccaccaccac	ctctgccc	1500
agcagcacca	cctcggtcc	tgccaccacc	accaccgcca	gcgctggccc	caaggctggc	1560
cgtggcagc	agtgcggcg	catcggttc	actggcccga	cccagtgcga	ggagccctac	1620
acttgcacca	agctcaacga	ctggtaactct	cagtgcctgt	aa		1662

<210> 8  
 <211> 1602  
 <212> DNA  
 <213> *Scy whole*

<400> 8

atgcgttaccg	ccaagttcgcc	caccctcgcc	gcccttgtgg	cctcggccgc	cgcccagcag	60
gcgtgcagcc	tcaccaccga	gaggcaccct	tccctctcct	ggaagaagtgc	caccgcccggc	120
ggccagtgcc	agaccgtcca	ggcttccatc	actctcgact	ccaactggcg	ctggactcac	180
caggtgtctg	gctccaccaa	ctgctacacg	ggcaacgagt	gggattctag	catctgcact	240
gatgccaagt	cgtgcgtca	gaactgctgc	gtcgatggtg	ctgactacac	cagcacctat	300
ggcatcacca	ccaacggtga	ttccctgagc	ctcaagttcg	tcaccaaggg	ccagtagtgc	360
accaacgtcg	gctcggtac	ctacctgatg	gacggcgagg	acaagtatca	gacccttcgag	420
ctcctcggtca	acgagttcac	cttcgatgtc	gatgtctcca	acatcggtcg	cggctcaac	480
ggcgccctgt	acttcgttcc	catggacgccc	gatgggtggc	tcagccgcta	tcctggcaac	540
aaggctggtg	ccaagttacgg	taccggctac	tgcgtatgtc	agtgcggcc	tgacatcaag	600
ttcatcaacg	gcgaggccaa	cattgagggc	tggaccggct	ccaccaacga	ccccaaacgccc	660
ggcgccggcc	gctatggta	ctgctgtct	gagatggata	tctgggaggc	caacaacatg	720
gctactgcct	tcactcctca	cccttgcact	atcattggcc	agagccgctg	cgagggcgac	780
tcgtgcgttg	gcacctacag	caacgaccgc	tacggccggcg	tctgcgaccc	cgatggctgc	840
gacttcaacg	cgtatcgcca	gggcaacaag	accttctacg	gcaagggcat	gaccgtcgac	900
accaccaaga	agtcaccgt	cgtcaccctac	ttcctcaagg	acgccaacgg	cgatctcgcc	960
gagatcaacg	gcttctacgt	ccaggatggg	aagatcatcc	ccaactccga	gtccaccatc	1020
cccgccgtcg	agggaactc	catcaccctac	gattgggtcg	accggccagaa	ggttgcctt	1080
ggcgacattg	acgacttcaa	ccgcaagggc	ggcatgaagc	agatgggcaa	ggccctcgcc	1140

ggccccatgg	tcctggtcat	gtccatctgg	gatgaccacg	cctccaacat	gctctggctc	1200
gactcgacct	tccctgtcga	tgccgctggc	aagcccggcg	ccgagcgcgg	tgccctgccc	1260
accacacctgg	gtgtccctgc	tgagggttag	gccgaggccc	ccaaacagcaa	cgtcgcttc	1320
tccaaacatcc	gcttcggccc	catcggctcg	accgttgccg	gccttcccag	cgatggcggc	1380
aacaacggcg	gcaacaccac	cgtccagccc	ccgcccagca	ccaccaccac	ctctgcccagc	1440
agcagcacca	cctcggctcc	tgccaccacc	accaccgcca	gcgctggccc	caaggctggc	1500
cgctggcagc	agtgcggcgg	catcggcttc	actggcccga	cccagtgcga	ggagccctac	1560
acttgcacca	agtcacacga	ctggtactct	cagtgcctgt	aa		1602

<210> 9

<211> 533

<212> PRT

<213> *Scy wholeidium thermophilum*

<400> 9

Met	Arg	Thr	Ala	Lys	Phe	Ala	Thr	Leu	Ala	Ala	Leu	Val	Ala	Ser	Ala
1					5				10					15	
Ala	Ala	Gln	Gln	Ala	Cys	Ser	Leu	Thr	Thr	Glu	Arg	His	Pro	Ser	Leu
								20		25				30	
Ser	Trp	Lys	Lys	Cys	Thr	Ala	Gly	Gly	Gln	Cys	Gln	Thr	Val	Gln	Ala
							35		40				45		
Ser	Ile	Thr	Leu	Asp	Ser	Asn	Trp	Arg	Trp	Thr	His	Gln	Val	Ser	Gly
								50		55			60		
Ser	Thr	Asn	Cys	Tyr	Thr	Gly	Asn	Glu	Trp	Asp	Ser	Ser	Ile	Cys	Thr
							65		70		75		80		
Asp	Ala	Lys	Ser	Cys	Ala	Gln	Asn	Cys	Cys	Val	Asp	Gly	Ala	Asp	Tyr
							85			90			95		
Thr	Ser	Thr	Tyr	Gly	Ile	Thr	Thr	Asn	Gly	Asp	Ser	Leu	Ser	Leu	Lys
					100				105				110		
Phe	Val	Thr	Lys	Gly	Gln	Tyr	Ser	Thr	Asn	Val	Gly	Ser	Arg	Thr	Tyr
							115		120				125		
Leu	Met	Asp	Gly	Glu	Asp	Lys	Tyr	Gln	Thr	Phe	Glu	Leu	Leu	Gly	Asn
							130		135				140		
Glu	Phe	Thr	Phe	Asp	Val	Asp	Val	Ser	Asn	Ile	Gly	Cys	Gly	Leu	Asn
							145		150		155		160		
Gly	Ala	Leu	Tyr	Phe	Val	Ser	Met	Asp	Ala	Asp	Gly	Gly	Leu	Ser	Arg
							165			170			175		
Tyr	Pro	Gly	Asn	Lys	Ala	Gly	Ala	Lys	Tyr	Gly	Thr	Gly	Tyr	Cys	Asp
							180			185			190		
Ala	Gln	Cys	Pro	Arg	Asp	Ile	Lys	Phe	Ile	Asn	Gly	Glu	Ala	Asn	Ile
							195		200				205		
Glu	Gly	Trp	Thr	Gly	Ser	Thr	Asn	Asp	Pro	Asn	Ala	Gly	Ala	Gly	Arg
							210		215				220		
Tyr	Gly	Thr	Cys	Cys	Ser	Glu	Met	Asp	Ile	Trp	Glu	Ala	Asn	Asn	Met
							225		230		235		240		
Ala	Thr	Ala	Phe	Thr	Pro	His	Pro	Cys	Thr	Ile	Ile	Gly	Gln	Ser	Arg
							245			250			255		
Cys	Glu	Gly	Asp	Ser	Cys	Gly	Gly	Thr	Tyr	Ser	Asn	Asp	Arg	Tyr	Ala
							260		265				270		
Gly	Val	Cys	Asp	Pro	Asp	Gly	Cys	Asp	Phe	Asn	Ala	Tyr	Arg	Gln	Gly
							275		280				285		
Asn	Lys	Thr	Phe	Tyr	Gly	Lys	Gly	Met	Thr	Val	Asp	Thr	Thr	Lys	Lys
							290		295				300		
Leu	Thr	Val	Val	Thr	Gln	Phe	Leu	Lys	Asp	Ala	Asn	Gly	Asp	Leu	Gly
							305		310		315		320		
Glu	Ile	Lys	Arg	Phe	Tyr	Val	Gln	Asp	Gly	Lys	Ile	Ile	Pro	Asn	Ser
							325			330			335		
Glu	Ser	Thr	Ile	Pro	Gly	Val	Glu	Gly	Asn	Ser	Ile	Thr	Gln	Asp	Trp
							340			345			350		
Cys	Asp	Arg	Gln	Lys	Val	Ala	Phe	Gly	Asp	Ile	Asp	Asp	Phe	Asn	Arg
							355		360				365		
Lys	Gly	Gly	Met	Lys	Gln	Met	Gly	Lys	Ala	Leu	Ala	Gly	Pro	Met	Val

370	375	380
Leu Val Met Ser Ile Trp Asp Asp His Ala Ser	Asn Met Leu Trp Leu	
385 390	395	400
Asp Ser Thr Phe Pro Val Asp Ala Ala Gly	Lys Pro Gly Ala Glu Arg	
405	410	415
Gly Ala Cys Pro Thr Thr Ser Gly Val Pro	Ala Glu Val Glu Ala Glu	
420	425	430
Ala Pro Asn Ser Asn Val Val Phe Ser Asn Ile Arg	Phe Gly Pro Ile	
435	440	445
Gly Ser Thr Val Ala Gly Leu Pro Ser Asp Gly	Gly Asn Asn Gly Gly	
450 455	460	
Asn Thr Thr Val Gln Pro Pro Ser Thr Thr	Thr Thr Ser Ala Ser	
465 470	475	480
Ser Ser Thr Thr Ser Ala Pro Ala Thr Thr	Thr Ala Ser Ala Gly	
485	490	495
Pro Lys Ala Gly Arg Trp Gln Gln Cys Gly	Gly Ile Gly Phe Thr Gly	
500	505	510
Pro Thr Gln Cys Glu Glu Pro Tyr Thr Cys Thr	Lys Leu Asn Asp Trp	
515	520	525
Tyr Ser Gln Cys Leu		
530		

<210> 10

<211> 497

<212> PRT

<213> Hypocrea jecorina

<400> 10

Gln Ser Ala Cys Thr Leu Gln Ser Glu Thr His Pro Pro Leu Thr Trp		
1 5 10 15		
Gln Lys Cys Ser Ser Gly Gly Thr Cys Thr Gln Gln Thr Gly Ser Val		
20 25 30		
Val Ile Asp Ala Asn Trp Arg Trp Thr His Ala Thr Asn Ser Ser Thr		
35 40 45		
Asn Cys Tyr Asp Gly Asn Thr Trp Ser Ser Thr Leu Cys Pro Asp Asn		
50 55 60		
Glu Thr Cys Ala Lys Asn Cys Cys Leu Asp Gly Ala Ala Tyr Ala Ser		
65 70 75 80		
Thr Tyr Gly Val Thr Thr Ser Gly Asn Ser Leu Ser Ile Gly Phe Val		
85 90 95		
Thr Gln Ser Ala Gln Lys Asn Val Gly Ala Arg Leu Tyr Leu Met Ala		
100 105 110		
Ser Asp Thr Thr Tyr Gln Glu Phe Thr Leu Leu Gly Asn Glu Phe Ser		
115 120 125		
Phe Asp Val Asp Val Ser Gln Leu Pro Cys Gly Leu Asn Gly Ala Leu		
130 135 140		
Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Val Ser Lys Tyr Pro Thr		
145 150 155 160		
Asn Thr Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ser Gln Cys		
165 170 175		
Pro Arg Asp Leu Lys Phe Ile Asn Gly Gln Ala Asn Val Glu Gly Trp		
180 185 190		
Glu Pro Ser Ser Asn Asn Ala Asn Thr Gly Ile Gly Gly His Gly Ser		
195 200 205		
Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Ser Ile Ser Glu Ala		
210 215 220		
Leu Thr Pro His Pro Cys Thr Thr Val Gly Gln Glu Ile Cys Glu Gly		
225 230 235 240		
Asp Gly Cys Gly Gly Thr Tyr Ser Asp Asn Arg Tyr Gly Gly Thr Cys		
245 250 255		
Asp Pro Asp Gly Cys Asp Trp Asn Pro Tyr Arg Leu Gly Asn Thr Ser		
260 265 270		

Phe Tyr Gly Pro Gly Ser Ser Phe Thr Leu Asp Thr Thr Lys Lys Leu  
 275 280 285  
 Thr Val Val Thr Gln Phe Glu Thr Ser Gly Ala Ile Asn Arg Tyr Tyr  
 290 295 300  
 Val Gln Asn Gly Val Thr Phe Gln Gln Pro Asn Ala Glu Leu Gly Ser  
 305 310 315 320  
 Tyr Ser Gly Asn Glu Leu Asn Asp Asp Tyr Cys Thr Ala Glu Glu Ala  
 325 330 335  
 Glu Phe Gly Gly Ser Ser Phe Ser Asp Lys Gly Gly Leu Thr Gln Phe  
 340 345 350  
 Lys Lys Ala Thr Ser Gly Gly Met Val Leu Val Met Ser Leu Trp Asp  
 355 360 365  
 Asp Tyr Tyr Ala Asn Met Leu Trp Leu Asp Ser Thr Tyr Pro Thr Asn  
 370 375 380  
 Glu Thr Ser Ser Thr Pro Gly Ala Val Arg Gly Ser Cys Ser Thr Ser  
 385 390 395 400  
 Ser Gly Val Pro Ala Gln Val Glu Ser Gln Ser Pro Asn Ala Lys Val  
 405 410 415  
 Thr Phe Ser Asn Ile Lys Phe Gly Pro Ile Gly Ser Thr Gly Asn Pro  
 420 425 430  
 Ser Gly Gly Asn Pro Pro Gly Gly Asn Pro Pro Gly Thr Thr Thr Thr  
 435 440 445  
 Arg Arg Pro Ala Thr Thr Thr Gly Ser Ser Pro Gly Pro Thr Gln Ser  
 450 455 460  
 His Tyr Gly Gln Cys Gly Gly Ile Gly Tyr Ser Gly Pro Thr Val Cys  
 465 470 475 480  
 Ala Ser Gly Thr Thr Cys Gln Val Leu Asn Pro Tyr Tyr Ser Gln Cys  
 485 490 495

Leu

<210> 11  
 <211> 515  
 <212> PRT  
 <213> *Scytalidium thermophilum*

<400> 11

Gln	Gln	Ala	Cys	Ser	Leu	Thr	Thr	Glu	Arg	His	Pro	Ser	Leu	Ser	Trp
1			5				10						15		
Lys	Lys	Cys	Thr	Ala	Gly	Gly	Gln	Cys	Gln	Thr	Val	Gln	Ala	Ser	Ile
			20				25						30		
Thr	Leu	Asp	Ser	Asn	Trp	Arg	Trp	Thr	His	Gln	Val	Ser	Gly	Ser	Thr
	35				40			45							
Asn	Cys	Tyr	Thr	Gly	Asn	Glu	Trp	Asp	Ser	Ser	Ile	Cys	Thr	Asp	Ala
	50				55				60						
Lys	Ser	Cys	Ala	Gln	Asn	Cys	Cys	Val	Asp	Gly	Ala	Asp	Tyr	Thr	Ser
	65				70			75					80		
Thr	Tyr	Gly	Ile	Thr	Thr	Asn	Gly	Asp	Ser	Leu	Ser	Leu	Lys	Phe	Val
			85				90						95		
Thr	Lys	Gly	Gln	Tyr	Ser	Thr	Asn	Val	Gly	Ser	Arg	Thr	Tyr	Leu	Met
			100				105						110		
Asp	Gly	Glu	Asp	Lys	Tyr	Gln	Thr	Phe	Glu	Leu	Leu	Gly	Asn	Glu	Phe
	115				120			125							
Thr	Phe	Asp	Val	Asp	Val	Ser	Asn	Ile	Gly	Cys	Gly	Leu	Asn	Gly	Ala
	130				135				140						
Leu	Tyr	Phe	Val	Ser	Met	Asp	Ala	Asp	Gly	Gly	Leu	Ser	Arg	Tyr	Pro
	145				150				155				160		
Gly	Asn	Lys	Ala	Gly	Ala	Lys	Tyr	Gly	Thr	Gly	Tyr	Cys	Asp	Ala	Gln
					165			170					175		
Cys	Pro	Arg	Asp	Ile	Lys	Phe	Ile	Asn	Gly	Glu	Ala	Asn	Ile	Glu	Gly
				180			185					190			
Trp	Thr	Gly	Ser	Thr	Asn	Asp	Pro	Asn	Ala	Gly	Ala	Gly	Arg	Tyr	Gly

195	200	205
Thr Cys Cys Ser Glu Met Asp	Ile Trp Glu Ala Asn	Asn Met Ala Thr
210	215	220
Ala Phe Thr Pro His Pro Cys	Thr Ile Ile Gly Gln	Ser Arg Cys Glu
225	230	235
Gly Asp Ser Cys Gly Gly	Thr Tyr Ser Asn Asp	Arg Tyr Ala Gly Val
245	250	255
Cys Asp Pro Asp Gly Cys Asp Phe	Asn Ala Tyr Arg Gln	Gly Asn Lys
260	265	270
Thr Phe Tyr Gly Lys Gly Met	Thr Val Asp Thr Thr	Lys Lys Leu Thr
275	280	285
Val Val Thr Gln Phe Leu Lys	Asp Ala Asn Gly	Asp Leu Gly Glu Ile
290	295	300
Lys Arg Phe Tyr Val Gln Asp	Gly Lys Ile Ile	Pro Asn Ser Glu Ser
305	310	315
Thr Ile Pro Gly Val Glu Gly Asn Ser	Ile Thr Gln Asp Trp	Cys Asp
325	330	335
Arg Gln Lys Val Ala Phe Gly Asp	Ile Asp Asp Phe Asn	Arg Lys Gly
340	345	350
Gly Met Lys Gln Met Gly Lys Ala	Leu Ala Gly Pro	Met Val Leu Val
355	360	365
Met Ser Ile Trp Asp Asp His	Ala Ser Asn Met	Leu Trp Leu Asp Ser
370	375	380
Thr Phe Pro Val Asp Ala Ala Gly Lys	Pro Gly Ala Glu Arg	Gly Ala
385	390	395
Cys Pro Thr Thr Ser Gly Val Pro Ala	Glu Val Glu Ala Glu Ala	Pro
405	410	415
Asn Ser Asn Val Val Phe Ser Asn	Ile Arg Phe Gly Pro	Ile Gly Ser
420	425	430
Thr Val Ala Gly Leu Pro Ser Asp	Gly Gly Asn Asn	Gly Gly Asn Thr
435	440	445
Thr Val Gln Pro Pro Pro Ser	Thr Thr Thr Ser	Ala Ser Ser Ser
450	455	460
Thr Thr Ser Ala Pro Ala Thr	Thr Thr Thr Ala Ser	Ala Gly Pro Lys
465	470	475
Ala Gly Arg Trp Gln Gln Cys Gly Gly	Ile Gly Phe Thr Gly	Pro Thr
485	490	495
Gln Cys Glu Glu Pro Tyr Thr Cys	Thr Lys Leu Asn Asp	Trp Tyr Ser
500	505	510
Gln Cys Leu		
515		

<210> 12

<211> 507

<212> PRT

<213> Artificial Sequence

<220>

<223> consensus sequence

<400> 12

Gln Gln Ala Cys Ser Leu Thr	Thr Glu Arg His	Pro Ser Leu Ser Trp	
1	5	10	15
Lys Lys Cys Thr Ala Gly Gly	Gln Cys Gln Thr Val	Gln Ala Ser Ile	
20	25	30	
Thr Leu Asp Ser Asn Trp Arg	Trp Thr His Gln Val	Ser Gly Ser Thr	
35	40	45	
Asn Cys Tyr Thr Gly Asn Lys	Trp Asp Ser Ser	Ile Cys Thr Asp Ala	
50	55	60	
Lys Ser Cys Ala Gln Asn Cys	Cys Val Asp Gly	Ala Asp Tyr Thr Ser	
65	70	75	80
Thr Tyr Gly Ile Thr Thr Asn	Gly Asp Ser Leu	Ser Leu Lys Phe Val	

85	90	95
Thr Lys Gly Gln His Ser Thr Asn Val	Gly Ser Arg Thr Tyr	Leu Met
100	105	110
Asp Gly Glu Asp Lys Tyr Gln Thr Phe	Glu Leu Leu Gly Asn Glu Phe	
115	120	125
Thr Phe Asp Val Asp Val Ser Asn Ile	Gly Cys Gly Leu Asn Gly Ala	
130	135	140
Leu Tyr Phe Val Ser Met Asp Ala Asp	Gly Gly Leu Ser Arg Tyr Pro	
145	150	160
Gly Asn Lys Ala Gly Ala Lys Tyr Gly	Thr Gly Tyr Cys Asp Ala Gln	
165	170	175
Cys Pro Arg Asp Ile Lys Phe Ile Asn	Gly Glu Ala Asn Ile Glu Gly	
180	185	190
Trp Thr Gly Ser Thr Asn Asp Pro Asn	Ala Gly Ala Gly Arg Tyr Gly	
195	200	205
Thr Cys Cys Ser Glu Met Asp Ile Trp	Glu Ala Asn Asn Met Ala Thr	
210	215	220
Ala Phe Thr Pro His Pro Cys Thr Ile	Ile Gly Gln Ser Arg Cys Glu	
225	230	240
Gly Asp Ser Cys Gly Gly Thr Tyr Ser	Asn Glu Arg Tyr Ala Gly Val	
245	250	255
Cys Asp Pro Asp Gly Cys Asp Phe	Asn Ser Tyr Arg Gln Gly Asn Lys	
260	265	270
Thr Phe Tyr Gly Lys Gly Met Thr Val	Asp Thr Thr Lys Lys Ile Thr	
275	280	285
Val Val Thr Gln Phe Leu Lys Asp	Ala Asn Gly Asp Leu Gly Glu Ile	
290	295	300
Lys Arg Phe Tyr Val Gln Asp Gly Lys	Ile Ile Pro Asn Ser Glu Ser	
305	310	320
Thr Ile Pro Gly Val Glu Gly Asn Ser	Ile Thr Gln Asp Trp Cys Asp	
325	330	335
Arg Gln Lys Val Ala Phe Gly Asp Ile	Asp Asp Phe Asn Arg Lys Gly	
340	345	350
Gly Met Lys Gln Met Gly Lys Ala	Leu Ala Gly Pro Met Val Leu Val	
355	360	365
Met Ser Ile Trp Asp Asp His Ala Ser	Asn Met Leu Trp Leu Asp Ser	
370	375	380
Thr Phe Pro Val Asp Ala Ala Gly Lys	Pro Gly Ala Glu Arg Gly Ala	
385	390	400
Cys Pro Thr Thr Ser Gly Val Pro Ala	Glu Val Glu Ala Glu Ala Pro	
405	410	415
Asn Ser Asn Val Val Phe Ser Asn Ile	Arg Phe Gly Pro Ile Gly Ser	
420	425	430
Thr Val Ala Gly Leu Pro Gly Ala	Gly Asn Gly Gly Asn Asn Gly	
435	440	445
Asn Pro Pro Pro Thr Thr Thr Ser Ser	Ala Pro Ala Thr Thr	
450	455	460
Thr Thr Ala Ser Ala Gly Pro Lys Ala	Gly Arg Trp Gln Gln Cys Gly	
465	470	480
Gly Ile Gly Phe Thr Gly Pro Thr Gln	Cys Glu Glu Pro Tyr Thr Cys	
485	490	495
Thr Lys Leu Asn Asp Trp Tyr Ser Gln	Cys Leu	
500	505	

<210> 13

<211> 507

<212> PRT

<213> Artificial Sequence

<220>

<223> consensus sequence

<400> 13

Gln Gln Ala Cys Ser Leu Thr Thr Glu Arg His Pro Ser Leu Ser Trp  
1 5 10 15  
Lys Lys Cys Thr Ala Gly Gly Gln Cys Gln Thr Val Gln Ala Ser Ile  
20 25 30  
Thr Leu Asp Ser Asn Trp Arg Trp Thr His Gln Val Ser Gly Ser Thr  
35 40 45  
Asn Cys Tyr Thr Gly Asn Lys Trp Asp Thr Ser Ile Cys Thr Asp Ala  
50 55 60  
Lys Ser Cys Ala Gln Asn Cys Cys Val Asp Gly Ala Asp Tyr Thr Ser  
65 70 75 80  
Thr Tyr Gly Ile Thr Thr Asn Gly Asp Ser Leu Ser Leu Lys Phe Val  
85 90 95  
Thr Lys Gly Gln His Ser Thr Asn Val Gly Ser Arg Thr Tyr Leu Met  
100 105 110  
Asp Gly Glu Asp Lys Tyr Gln Thr Phe Glu Leu Leu Gly Asn Glu Phe  
115 120 125  
Thr Phe Asp Val Asp Val Ser Asn Ile Gly Cys Gly Leu Asn Gly Ala  
130 135 140  
Leu Tyr Phe Val Ser Met Asp Ala Asp Gly Gly Leu Ser Arg Tyr Pro  
145 150 155 160  
Gly Asn Lys Ala Gly Ala Lys Tyr Gly Thr Gly Tyr Cys Asp Ala Gln  
165 170 175  
Cys Pro Arg Asp Ile Lys Phe Ile Asn Gly Glu Ala Asn Ile Glu Gly  
180 185 190  
Trp Thr Gly Ser Thr Asn Asp Pro Asn Ala Gly Ala Gly Arg Tyr Gly  
195 200 205  
Thr Cys Cys Ser Glu Met Asp Ile Trp Glu Ala Asn Asn Met Ala Thr  
210 215 220  
Ala Phe Thr Pro His Pro Cys Thr Ile Ile Gly Gln Ser Arg Cys Glu  
225 230 235 240  
Gly Asp Ser Cys Gly Gly Thr Tyr Ser Asn Glu Arg Tyr Ala Gly Val  
245 250 255  
Cys Asp Pro Asp Gly Cys Asp Phe Asn Ser Tyr Arg Gln Gly Asn Lys  
260 265 270  
Thr Phe Tyr Gly Lys Gly Met Thr Val Asp Thr Thr Lys Lys Ile Thr  
275 280 285  
Val Val Thr Gln Phe Leu Lys Asp Ala Asn Gly Asp Leu Gly Glu Ile  
290 295 300  
Lys Arg Phe Tyr Val Gln Asp Gly Lys Ile Ile Pro Asn Ser Glu Ser  
305 310 315 320  
Thr Ile Pro Gly Val Glu Gly Asn Ser Ile Thr Gln Asp Trp Cys Asp  
325 330 335  
Arg Gln Lys Val Ala Phe Gly Asp Ile Asp Asp Phe Asn Arg Lys Gly  
340 345 350  
Gly Met Lys Gln Met Gly Lys Ala Leu Ala Gly Pro Met Val Leu Val  
355 360 365  
Met Ser Ile Trp Asp Asp His Ala Ser Asn Met Leu Trp Leu Asp Ser  
370 375 380  
Thr Phe Pro Val Asp Ala Ala Gly Lys Pro Gly Ala Glu Arg Gly Ala  
385 390 395 400  
Cys Pro Thr Thr Ser Gly Val Pro Ala Glu Val Glu Ala Glu Ala Pro  
405 410 415  
Asn Ser Asn Val Val Phe Ser Asn Ile Arg Phe Gly Pro Ile Gly Ser  
420 425 430  
Thr Val Ala Gly Leu Pro Gly Ala Gly Asn Gly Gly Asn Asn Gly Gly  
435 440 445  
Asn Pro Pro Pro Thr Thr Thr Ser Ser Ala Pro Ala Thr Thr  
450 455 460  
Thr Thr Ala Ser Ala Gly Pro Lys Ala Gly Arg Trp Gln Gln Cys Gly  
465 470 475 480  
Gly Ile Gly Phe Thr Gly Pro Thr Gln Cys Glu Glu Pro Tyr Thr Cys

	485	490	495
Thr Lys Leu Asn Asp Trp Tyr Ser Gln Cys Leu			
	500	505	
<210> 14			
<211> 20			
<212> DNA			
<213> Artificial Sequence			
<220>			
<223> primer			
<400> 14			
atgcgttacccg ccaagttcgc			20
<210> 15			
<211> 22			
<212> DNA			
<213> Artificial Sequence			
<220>			
<223> primer			
<400> 15			
ttacaggcac tgagagtacc ag			22